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(54) **IMPROVEMENTS IN BALLS FOR PLAYING GAMES**

VERBESSERUNGEN BEI SPIELBÄLLEN

AMELIORATIONS APPORTEES A DES BALLES POUR JEUX LUDIQUES

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(56) References cited:  
**EP-A- 0 157 083 EP-A- 0 333 529  
BE-A6- 1 016 081 US-A- 5 431 393  
US-A- 5 503 699 US-A1- 2004 127 312  
US-B1- 6 283 881**

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## Description

**[0001]** This invention relates to improvements in balls for playing games and more particularly to balls for playing games involving handling of the ball by the players. Such games may include Rugby football, American football as well as handball games such as basketball and netball.

**[0002]** It is known to provide such balls with a surface patterning comprising raised protuberances being projections or pimples and in a regular or irregular spaced array.

**[0003]** US 2004/127312 A1 (Guenther Douglas et al) discloses a game ball comprising a casing having a laced region and lacing coupled to the laced region, the lacing having a pebbled texture.

**[0004]** EP 4570931 (Martin) discloses a basketball provided with rows of pebbles or projections, each of which has a flat triangular outer surface and three pointed apexes.

**[0005]** It is an object of this invention to provide a ball with an improved configuration and shape of protuberance which provides enhanced handling qualities particularly reducing slip and increasing grip as between the ball and the hand of a player.

**[0006]** According to this invention there is provided a ball for playing a game a defined in claim 1.

**[0007]** Preferably the protuberances taper in a direction away from the ball surface and have a generally conical side profile that is to say triangular in side view. The protuberances may have a polygonal planform or transverse cross-sectional profile whereby adjacent sides form said angular conjunction.

**[0008]** The transverse cross-sectional profile of the protuberances may be triangular, polygonal, or star shaped with preferably four to eight points, and/or the transverse cross-sectional profile of the protuberances may have a plurality of projecting arms. In a particular and preferred embodiment the transverse cross-sectional profile of the protuberances is star shaped with four to eight points and tapers away from the surface of the ball.

**[0009]** The orientation of adjacent protuberances as regards the angular conjunctions may be varied.

**[0010]** The outer surface may be formed from a panel comprising a flexible material in which the protuberances are formed by a pressing, moulding, casting, rolling or other process, the said protuberances thereby being integral with the cover material.

**[0011]** A preferred ball has the outer surface of the ball formed from a plurality of interconnected panels each having an inner fabric reinforcement layer and an outer flexible plastics layer in which the protuberances have been formed by a hot pressing or other process.

**[0012]** The density of the protuberances over a given area approximates to forty five per square centimetre up to forty five per five square centimetres. In a preferred configuration the density of the protuberances is between thirty-five and sixty-five per square centimetre. This will

depend on the size of the protuberances and the size of the ball. The exact configuration can be determined empirically and will be a function of the use to which the ball is to be put as well as the dimensions.

**[0013]** A discrete area of the surface of the ball may include a defined ordered pattern of protuberances with adjacent discrete areas being relatively offset thus the adjacent patterns will not form an overall regular pattern.

**[0014]** The surface of the ball may include protuberances produced by means of a plate forming a female mould with discrete depressions having angular sides formed by an etching or a spark erosion process.

**[0015]** For a ball to be used for playing rugby football, as example, the height of the protuberances is between 0.1 mm and 2.5 mm, preferably between 0.1 mm and 1.0 mm, and the width of the protuberances is between 0.1 mm and 2.5 mm, preferably between 0.5 mm and 1.5 mm. The height and the width of the protuberances may vary over the surface of the ball.

**[0016]** Other preferred features of this invention are defined in the claims appended hereto.

**[0017]** The ball in accordance with this invention is preferably of ovoid shape and is preferably for playing the game of rugby football.

**[0018]** This invention is further described and illustrated with reference to the drawings showing several embodiments by way of examples. In the drawings:

Fig.1a shows a plan view of the surface of a ball with protuberances being triangular in planform,  
 Fig. 1b shows a cross-section of one protuberance on line A-A of Fig. 1c,  
 Fig. 1c shows a detail plan view of one protuberance,  
 Fig. 1d shows a cross-section of one protuberance on line B-B of Fig. 1e,  
 Fig. 1e shows a detail plan view of one protuberance in a different orientation,  
 Figs. 2a - 2e show a second configuration of protuberances on the surface of a ball and with four point star planform and corresponding to the views of Figs 1a to 1e,  
 Figs. 3a - 3e show a third configuration of protuberances on the surface of a ball and with six point star planform,  
 Fig. 4 shows a further example of a triangular or three pointed shape as seen in planform,  
 Fig. 5 shows a further example of a four pointed star shape as seen in planform,  
 Fig. 6 shows a further example of a four pointed star shape as seen in planform and with additional cusps, and  
 Fig. 7 shows, in perspective view, a protuberance of Fig. 2.

**[0019]** Referring firstly to Fig. 1 of the drawings Fig. 1

a shows a part of the surface 1 of a rugby ball which includes a plurality of spaced protuberances 2 or pimples each having a triangular shaped planform with a triangular transverse cross-sectional profile which tapers away from the surface of the ball to an apex or rounded top. The areas on the surface of the ball defined by the broken lines 3 designate a pattern repeat area related to the orientation, number and spacing of the individual protuberances 2. As may be seen adjacent areas 3 are offset thus avoiding a regular and overall pattern repeat. A side sectional view and a plan view of a protuberance are shown in Fig. 1b and Fig. 1c respectively from one orientation and with Fig 1d and Fig. 1e showing similar views from a mutually right angled orientation. The protuberance in side view has a generally tapering or conical shape. In the drawings the ideal mould shape would include sharp angles 4 as shown in Fig. 1c, however due to the moulding process the points are will be somewhat rounded and softened.

[0020] As may be seen from Fig.1a the orientation of the protuberances 2 as seen in plan view is varied. In these embodiments the height of a protuberance 2 is some 0.5 mm and the base width about 1.0 mm. In this example forty-five protuberances are provided in an area bounded by 2.5 cm sides

[0021] The advantage of the configuration according to this invention is that at least a predominant part of the outer surface of the ball has a plurality of the protuberances and that the protuberances have an outer surface including a zone 4 formed by an angular conjunction between at least two side surfaces 10. In this case the triangular configuration provides three such angular points which have been found to significantly improve the properties of a ball from the handling aspect.

[0022] Fig. 2 shows a second embodiment in which the planform of each of the protuberances has four limbs forming a four point star shape. The arrangement is otherwise similar that described in conjunction with Fig. 1. In this embodiment it has been found, surprisingly, that a configuration including a concave angular shape defined by the inwardly deflected sides 10, has proved to be particularly beneficial from a handling point of view. Thus a configuration of protuberances which includes such a concave polygonal shape is of particular advantage due to the increased surface area provided.

[0023] Fig. 3 likewise shows a further embodiment in which each protuberance has a six pointed star shape. Here again the concave polygonal shape provides better grip by virtue of the enhanced surface area presented to the hands of a player.

[0024] Fig. 4a shows a triangular shape of protuberance 40, as seen in cross sectional plan and similar to Fig. 1 but in which the sides 41 are concavely curved.

[0025] Fig. 4b shows an arrangement wherein the sides 42 are concavely angled with an internal angle 43 greater than 180 degrees and forming a concave polygon.

[0026] Fig. 5 is similar to the protuberance shown in

Fig. 2 but here the concave sides 50 are smoothly curved rather than being angled in a concave polygonal form.

[0027] Fig. 6 shows a further arrangement in which the points 60 are joined by curved sides 61 including cusp-like points 62.

[0028] Fig. 7 shows a perspective view of the four point star shape protuberance of Fig. 2 and illustrating more clearly the concave polygonal shape having a pyramid form. In practice, due to the moulding process, the angles will not be as sharp as depicted in the drawing, which is diagrammatic.

[0029] In advantageous embodiments of this invention the sides joining the angular points, being the conjunction between two adjacent sides, are concave and preferably also define an internal angle greater than 180 degrees.

[0030] As described previously the protuberances project from the surface of the ball and define an apex preferably also being angular.

[0031] In all embodiments the shape of the protuberances seen in plan view includes the angular conjunction between adjacent side surfaces. The embodiments described are exemplary and the configuration of the sides of the protuberances may vary as may the number of "points". For example two sides having a curved shape may join with an angular point at each end or lozenge shape protuberances may be provided. A ball surface may include a mixture of different shapes for the protuberances.

[0032] If the surface of the cover of the ball is produced by a pressure moulding process the die will have sharp angular points to form the protuberances. During the moulding the nature of the material will inevitably round-off the points to certain degree but nevertheless providing an angular conjunction within the meaning of this invention as compared with a circular shape of the prior art for example.

[0033] This invention also embraces a cover material for use in the fabrication of a ball, particularly one having a plurality of panels connected together to form an outer cover and containing an inner inflatable bladder. The cover material includes an outer surface carrying the protuberances the cover material thus being specifically adapted for use in the manufacture of a ball as defined in any one of the appended claims.

## Claims

1. A ball for playing a game, particularly a game involving handling of the ball by players, wherein at least a predominant part of the outer surface (1) of the ball has a plurality of protuberances (2), wherein the protuberances have an outer surface including a zone (4) formed by an angular conjunction between at least two surfaces (10), **characterised in that** the bases of the protuberances (2) adjacent the outer surface (1) of the ball have a polygonal profile and define generally planar sides (10) which extend away

from the surface of the ball to an apex.

2. A ball in accordance with claim 1, **characterised in that** the sides of the protuberances (10) include concave angular portions. 5
3. A ball in accordance with claim 1 or 2, **characterised in that** the said profile is a concave polygon.
4. A ball in accordance with any preceding claim, **characterised in that** the transverse cross-sectional profile of the protuberances (2) is star shaped with four to eight points. 10
5. A ball in accordance with any preceding claim, **characterised in that** the transverse cross-sectional profile of the protuberances (2) includes a plurality of projecting arms. 15
6. A ball in accordance with any preceding claim, **characterised in that** the orientation of adjacent protuberances (2) as regards the angular conjunctions is varied. 20
7. A ball in accordance with any preceding claim, **characterised in that** the outer surface (1) of the ball comprises a flexible material on which the protuberances (2) are formed by a moulding process, the said protuberances (2) thereby being integral with the cover material. 25
8. A ball in accordance with any preceding claim, **characterised in that** the outer surface (1) of the ball comprises a plurality of interconnected panels each having an inner fabric reinforcement layer and an outer flexible plastics layer in which the protuberances have been formed by a hot pressing process. 30
9. A ball in accordance with any preceding claim, **characterised in that** the density of the protuberances (2) approximates to between forty per square centimetre and forty per five square centimetres. 35
10. A ball in accordance with any preceding claim, **characterised in that** the density of the protuberances (2) is between thirty-five and sixty-five per square centimetre. 40
11. A ball in accordance with any preceding claim, **characterised in that** a discrete area of the surface (1) of the ball includes a defined ordered pattern of protuberances (2) with adjacent discrete areas being relatively offset. 45
12. A ball in accordance with any preceding claim, **characterised in that** the protuberances (2) are produced by means of a plate forming a female mould with discrete depressions therein having angular 50

sides formed by an etching process.

13. A ball in accordance with any preceding claim, **characterised in that** the protuberances (2) are produced by means of a plate forming a female mould with depressions therein formed by a spark erosion process.
14. A ball in accordance with any preceding claim, **characterised in that** the height of the protuberances (2) is between 0.1 mm and 2.5 mm, preferably between 0.1 mm and 1.0 mm.
15. A ball in accordance with any preceding claim, **characterised in that** the width of the protuberances (2) is between 0.1 mm and 2.5 mm, preferably between 0.5 mm and 1.5 mm.
16. A ball in accordance with any preceding claim, **characterised in that** the height and the width of the protuberances (2) varies over the surface of the ball (1).
17. A ball in accordance with any preceding claim, **characterised in that** the ball is of ovoid shape and is preferably for playing the game of rugby football.

#### Patentansprüche

1. Ball zum Spielen eines Spiels, insbesondere eines Spiels, das das Umgehen mit dem Ball durch Spieler umfasst, wobei mindestens ein überwiegender Teil der Außenfläche (1) des Balls eine Vielzahl von Ausstülpungen (2) aufweist, wobei die Ausstülpungen eine Außenfläche haben, welche einen Bereich (4) enthält, der von einer winkligen Verbindung zwischen mindestens zwei Flächen (10) gebildet wird, **dadurch gekennzeichnet, dass** die Untenbereiche der Ausstülpungen (2) neben der Außenfläche (1) des Balls ein vieleckiges Profil haben und im Allgemeinen ebene Seiten (10) abgrenzen, welche sich von der Fläche des Balls weg zu einer Spitze hin erstrecken.
2. Ball gemäß Anspruch 1, **dadurch gekennzeichnet, dass** die Seiten der Ausstülpungen (10) konkave winklige Teilbereiche umfassen.
3. Ball gemäß Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** das Profil ein konkaves Vieleck ist.
4. Ball gemäß einem vorhergehenden Anspruch, **dadurch gekennzeichnet, dass** das transversale Querschnittsprofil der Ausstülpungen (2) sternförmig mit vier bis acht Punkten ist.
5. Ball gemäß einem vorhergehenden Anspruch, **da-**

durch gekennzeichnet, dass das transversale Querschnittsprofil der Ausstülpungen (2) eine Vielzahl vorstehender Arme umfasst.

6. Ball gemäß einem vorhergehenden Anspruch, **dadurch gekennzeichnet, dass** die Ausrichtung der nebeneinander liegenden Ausstülpungen (2), was die winkligen Verbindungen betrifft, unterschiedlich ist.
7. Ball gemäß einem vorhergehenden Anspruch, **dadurch gekennzeichnet, dass** die Außenfläche (1) des Balls ein biegsames Material umfasst, auf dem die Ausstülpungen (2) durch ein Formherstellungsverfahren geformt werden, wodurch die Ausstülpungen (2) mit dem Überzugsmaterial einstückig sind.
8. Ball gemäß einem vorhergehenden Anspruch, **dadurch gekennzeichnet, dass** die Außenfläche (1) des Balls eine Vielzahl von miteinander verbundenen Flächenteilen umfasst, die jeweils eine innere Textilverstärkungsschicht und eine äußere biegsame Kunststoffschicht aufweisen, in welcher die Ausstülpungen durch ein Heißpressverfahren geformt worden sind.
9. Ball gemäß einem vorhergehenden Anspruch, **dadurch gekennzeichnet, dass** die Dichte der Ausstülpungen (2) etwa vierzig pro Quadratzentimeter bis vierzig pro fünf Quadratzentimeter entspricht.
10. Ball gemäß einem vorhergehenden Anspruch, **dadurch gekennzeichnet, dass** die Dichte der Ausstülpungen (2) zwischen fünfunddreißig und fünfundsechzig pro Quadratzentimeter liegt.
11. Ball gemäß einem vorhergehenden Anspruch, **dadurch gekennzeichnet, dass** ein diskreter Bereich der Fläche (1) des Balls ein definiertes geordnetes Muster von Ausstülpungen (2) mit nebeneinander liegenden diskreten Bereichen umfasst, die relativ versetzt sind.
12. Ball gemäß einem vorhergehenden Anspruch, **dadurch gekennzeichnet, dass** die Ausstülpungen (2) mittels einer Platte hergestellt werden, die eine Negativform mit diskreten Vertiefungen darin bildet, welche winklige Seiten aufweisen, die durch ein Ätzverfahren geformt werden.
13. Ball gemäß einem vorhergehenden Anspruch, **dadurch gekennzeichnet, dass** die Ausstülpungen (2) mittels einer Platte hergestellt werden, die eine Negativform mit diskreten Vertiefungen darin bildet, welche durch ein Funkenerosionsverfahren geformt werden.
14. Ball gemäß einem vorhergehenden Anspruch, **da-**

durch gekennzeichnet, dass die Höhe der Ausstülpungen (2) zwischen 0,1 mm und 2,5 mm, bevorzugt zwischen 0,1 mm und 1,0 mm liegt.

- 5 15. Ball gemäß einem vorhergehenden Anspruch, **dadurch gekennzeichnet, dass** die Breite der Ausstülpungen (2) zwischen 0,1 mm und 2,5 mm, bevorzugt zwischen 0,5 mm und 1,5 mm liegt.
- 10 16. Ball gemäß einem vorhergehenden Anspruch, **dadurch gekennzeichnet, dass** die Höhe und die Breite der Ausstülpungen (2) an verschiedenen Stellen der Fläche des Balls (1) variieren.
- 15 17. Ball gemäß einem vorhergehenden Anspruch, **dadurch gekennzeichnet, dass** der Ball eiförmig und bevorzugt zum Spielen des Sports Rugby vorgesehen ist.

#### Revendications

1. Un ballon pour jouer à un jeu, en particulier un jeu impliquant la manipulation du ballon par des joueurs, dans lequel au moins une partie prédominante de la surface extérieure (1) du ballon a une pluralité de protubérances (2), dans lequel les protubérances ont une surface extérieure comprenant une zone (4) formée d'une intersection angulaire entre au moins deux surfaces (10), **caractérisé en ce que** les bases des protubérances (2) adjacentes à la surface extérieure (1) du ballon ont un profil polygonal et définissent des côtés généralement plans (10) qui s'étendent à l'écart de la surface du ballon jusqu'à un apex.
2. Un ballon conformément à la revendication 1, **caractérisé en ce que** les côtés des protubérances (10) comprennent des portions angulaires concaves.
3. Un ballon conformément à la revendication 1 ou 2, **caractérisé en ce que** ledit profil est un polygone concave.
4. Un ballon conformément à n'importe quelle revendication précédente, **caractérisé en ce que** le profil en coupe transversale des protubérances (2) est une étoile profilée avec quatre à huit branches.
5. Un ballon conformément à n'importe quelle revendication précédente, **caractérisé en ce que** le profil en coupe transversale des protubérances (2) comprend une pluralité de bras saillants.
6. Un ballon conformément à n'importe quelle revendication précédente, **caractérisé en ce que** l'orientation des protubérances (2) adjacentes par rapport

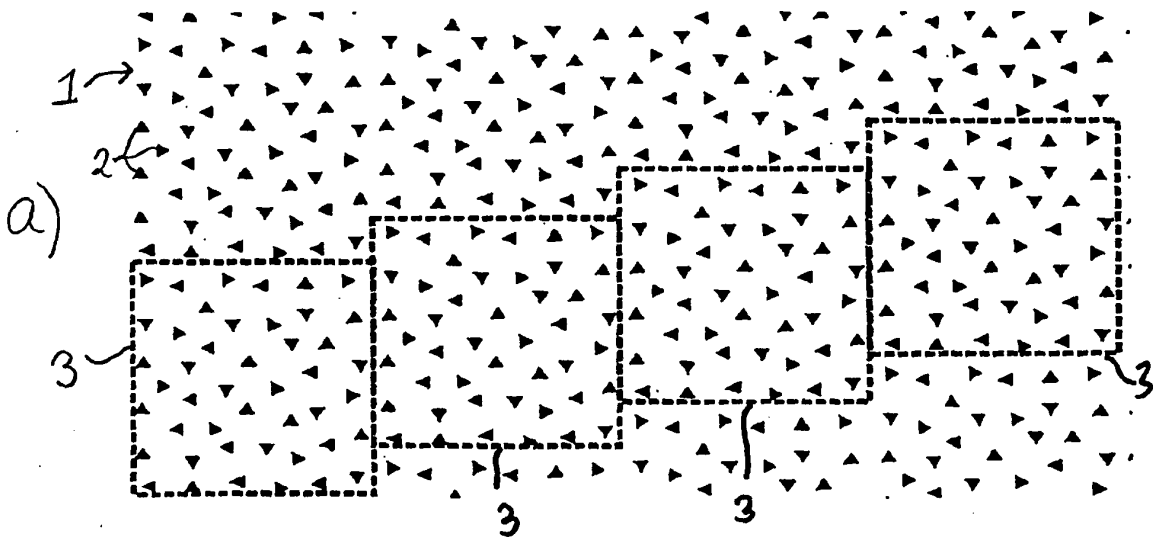
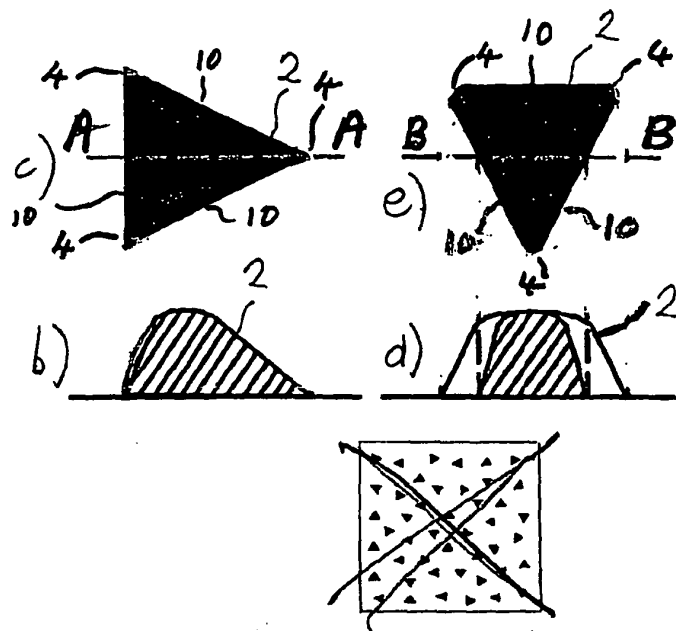
aux intersections angulaires est variée.

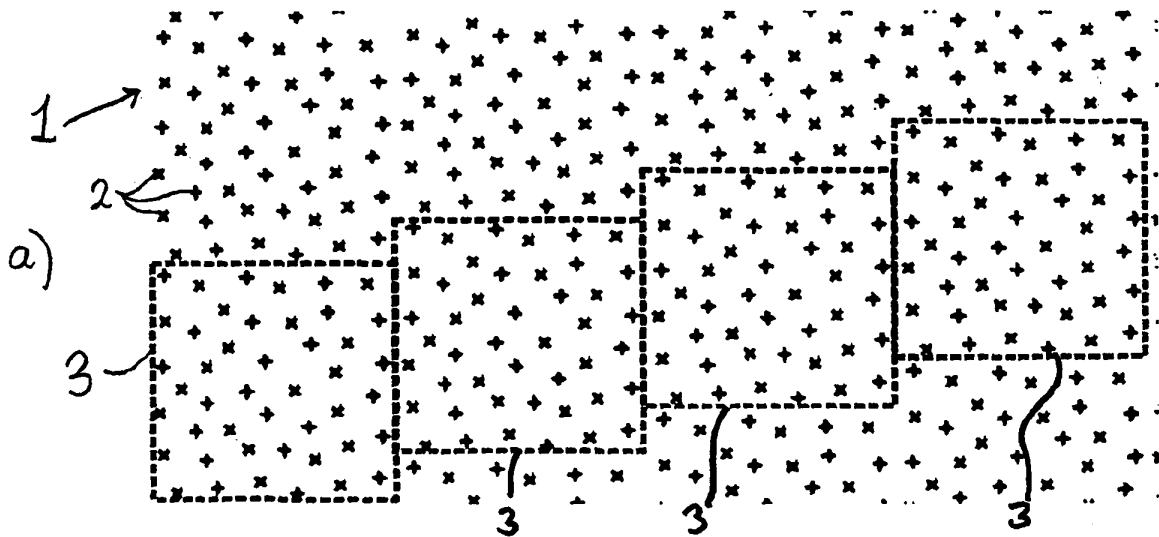
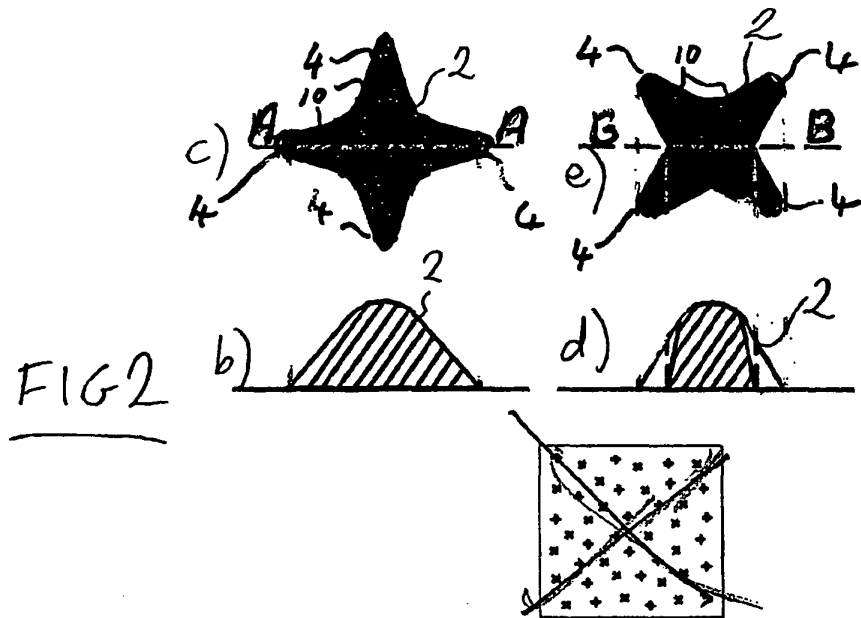
7. Un ballon conformément à n'importe quelle revendication précédente, **caractérisé en ce que** la surface extérieure (1) du ballon comporte un matériau flexible sur lequel les protubérances (2) sont formées par un processus de moulage, lesdites protubérances (2) faisant de ce fait partie intégrante du matériau de couverture. 5
8. Un ballon conformément à n'importe quelle revendication précédente, **caractérisé en ce que** la surface extérieure (1) du ballon comporte une pluralité de panneaux interconnectés ayant chacun une couche de renfort en tissu intérieure et une couche de plastique flexible extérieure dans laquelle les protubérances ont été formées par un processus de pressage à chaud. 10 15
9. Un ballon conformément à n'importe quelle revendication précédente, **caractérisé en ce que** la densité des protubérances (2) se situe approximativement entre quarante au centimètre carré et quarante aux cinq centimètres carrés. 20 25
10. Un ballon conformément à n'importe quelle revendication précédente, **caractérisé en ce que** la densité des protubérances (2) se situe entre trente-cinq et soixante-cinq au centimètre carré. 30
11. Un ballon conformément à n'importe quelle revendication précédente, **caractérisé en ce qu'une** zone discrète de la surface (1) du ballon comprend un modèle ordonné défini de protubérances (2), les zones discrètes adjacentes étant relativement décalées. 35
12. Un ballon conformément à n'importe quelle revendication précédente, **caractérisé en ce que** les protubérances (2) sont produites au moyen d'une plaque formant un moule femelle avec des creux discrets à l'intérieur de celui-ci ayant des côtés angulaires formés par un processus de gravure. 40
13. Un ballon conformément à n'importe quelle revendication précédente, **caractérisé en ce que** les protubérances (2) sont produites au moyen d'une plaque formant un moule femelle avec des creux à l'intérieur de celui-ci formés par un processus d'érosion par étincelles. 45 50
14. Un ballon conformément à n'importe quelle revendication précédente, **caractérisé en ce que** la hauteur des protubérances (2) se situe entre 0,1 mm et 2,5 mm, de préférence entre 0,1 mm et 1,0 mm. 55
15. Un ballon conformément à n'importe quelle revendication précédente, **caractérisé en ce que** la lar-

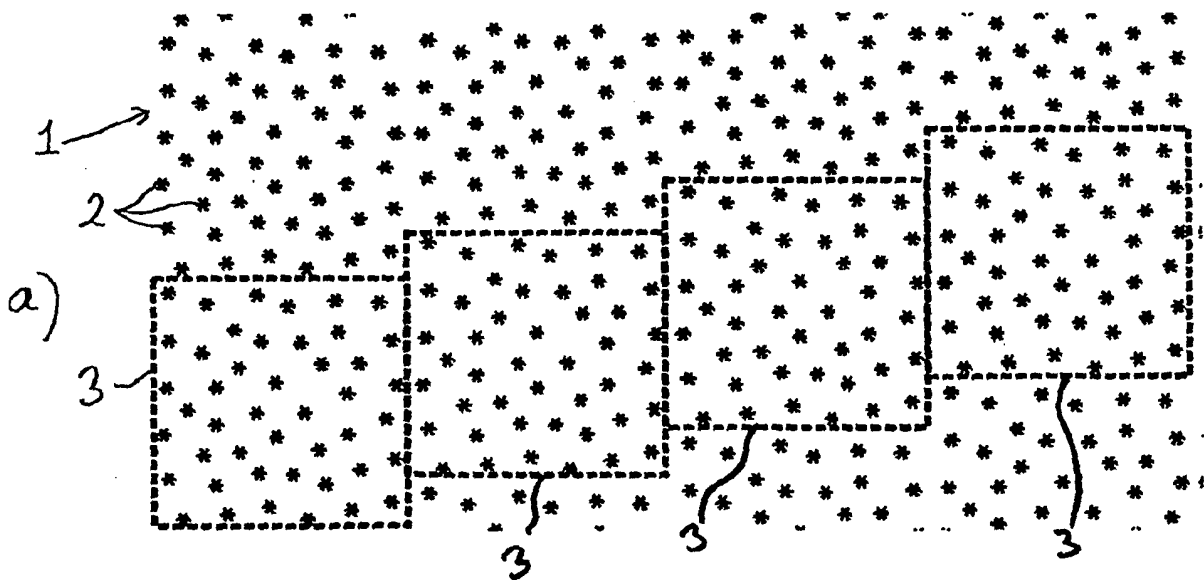
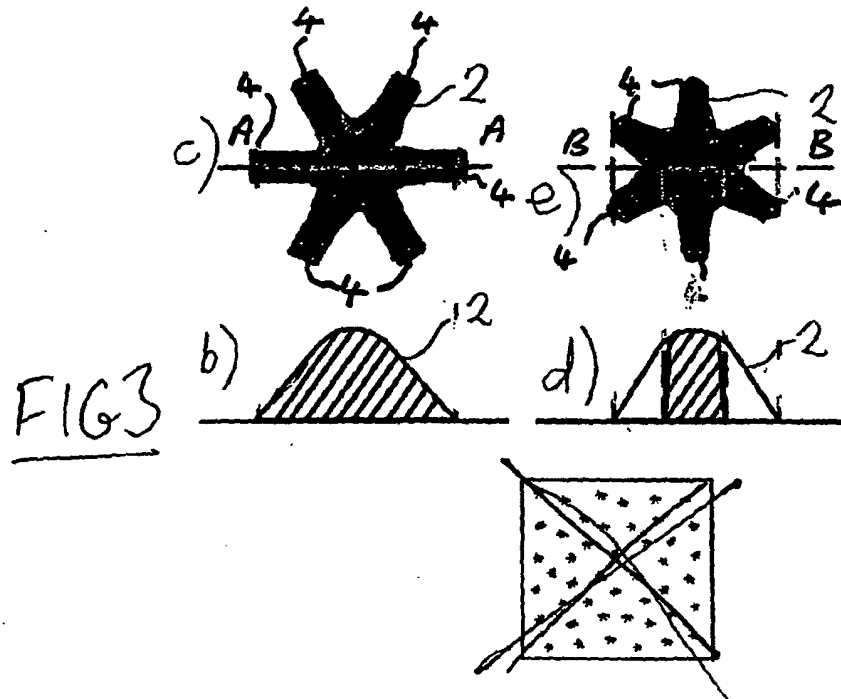
geur des protubérances (2) se situe entre 0,1 mm et 2,5 mm, de préférence entre 0,5 mm et 1,5 mm.

16. Un ballon conformément à n'importe quelle revendication précédente, **caractérisé en ce que** la hauteur et la largeur des protubérances (2) varient sur la surface du ballon (1).
17. Un ballon conformément à n'importe quelle revendication précédente, **caractérisé en ce que** le ballon est de forme ovoïde et est de préférence destiné à jouer au jeu de rugby.

FIG 1







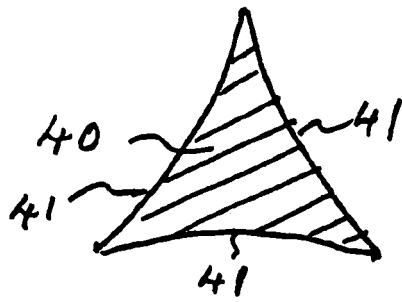


FIG 4a

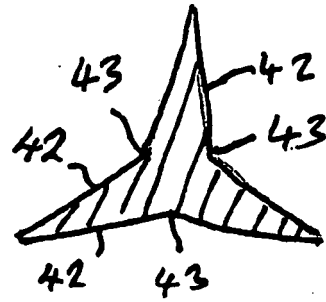


FIG 4b

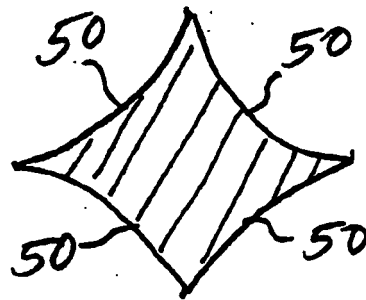


FIG 5

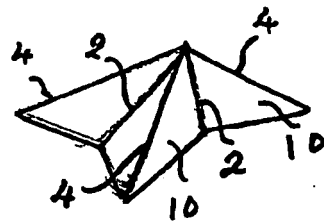


FIG 7

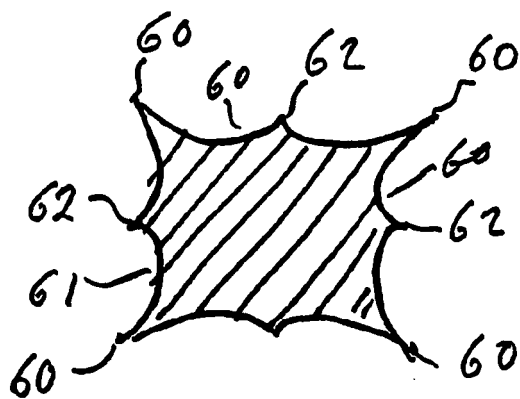


FIG 6

**REFERENCES CITED IN THE DESCRIPTION**

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**Patent documents cited in the description**

- US 2004127312 A1, Guenther Douglas [0003]
- EP 4570931 A, Martin [0004]